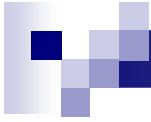


Pedestrian Device Guidance Workgroup



Steve Hamilton, P.E.
Al Grandy



I. Pedestrian Warrants

A) Existing

B) Proposed



A) Existing Warrant

Section 4C.05 Warrant 4, Pedestrian Volume

Support:

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that both of the following criteria are met:

- A. The pedestrian volume crossing the major street at an intersection or midblock location during an average day is 100 or more for each of any 4 hours or 190 or more during any 1 hour; and
- B. There are fewer than 60 gaps per hour in the traffic stream of adequate length to allow pedestrians to cross during the same period when the pedestrian volume criterion is satisfied. Where there is a divided street having a median of sufficient width for pedestrians to wait, the requirement applies separately to each direction of vehicular traffic.

The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 90 m (300 ft), unless the proposed traffic control signal will not restrict the progressive movement of traffic.

If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads conforming to requirements set forth in Chapter 4E.



B) Proposed Warrant

Support:

The Pedestrian Volume Signal Warrant is intended for applications where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

The need for a traffic control signal at an intersection (or midblock crossing) shall be considered if an engineering study finds that **one** of the following criteria **is** met...

Criterion A:

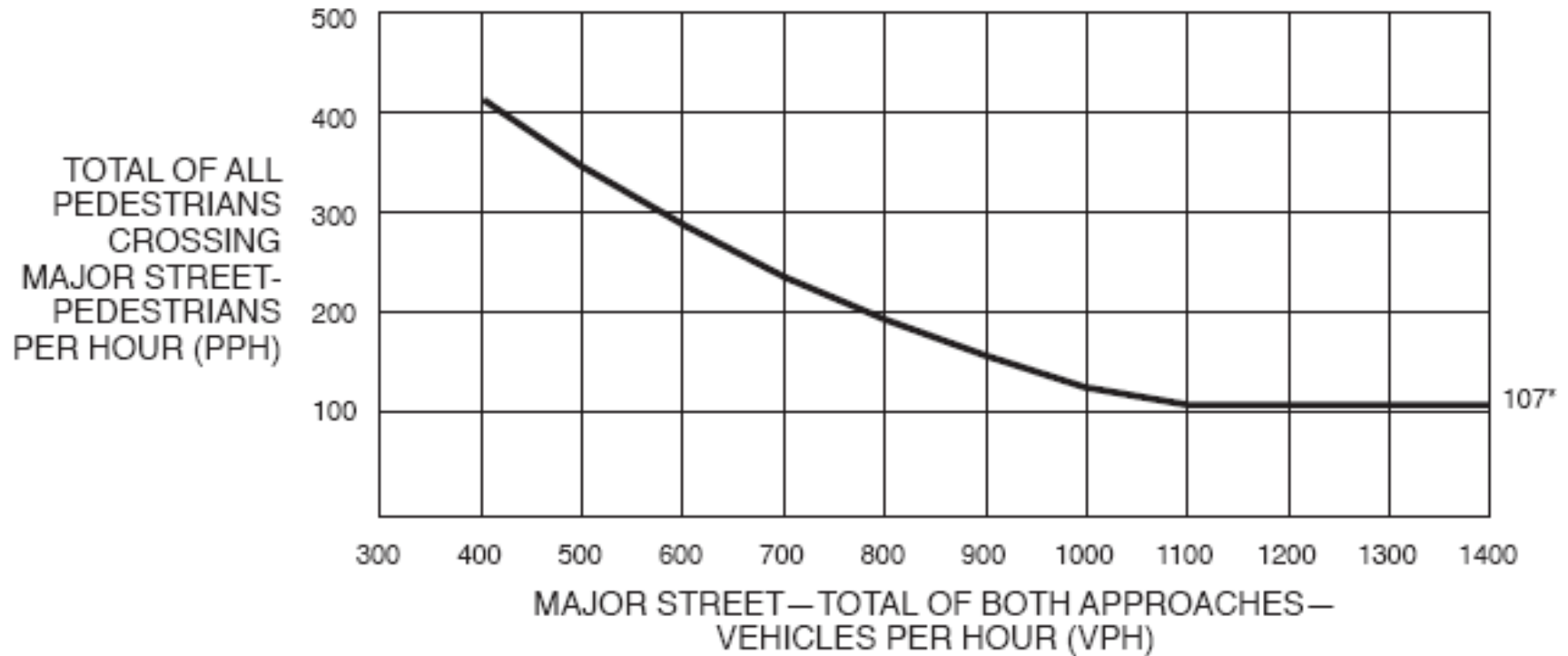
For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and...

Criterion A cont...

... the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or...

(Proposed Warrant)

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



*Note: 107 pph applies as the lower threshold volume.

Criterion B:

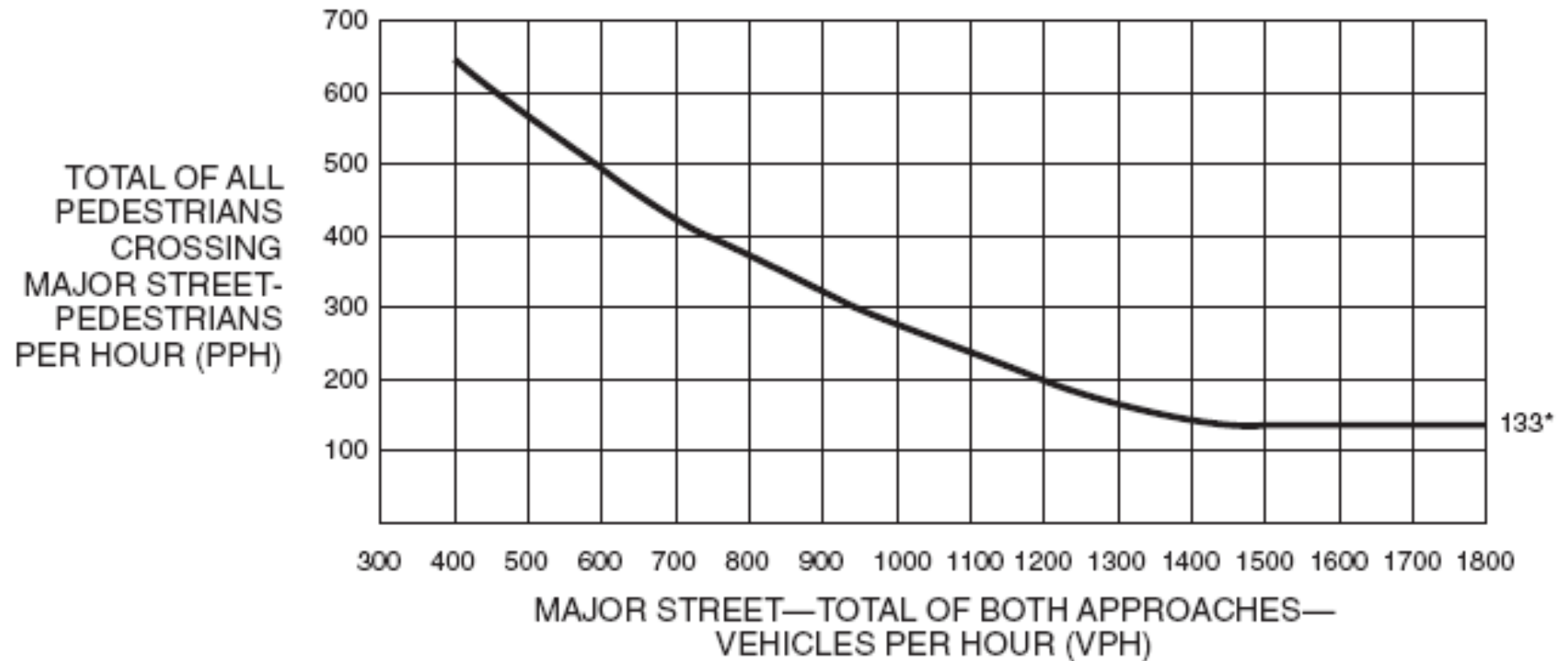
For one hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and ...

Criterion B cont...

... the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-6.

(Proposed Warrant)

Figure 4C-6. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Option:

If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 60 km/h or 35 mph, or...

If the intersection lies within the built-up area of an isolated community having a population of less than 10,000...

Then:

Figure 4C-7 may be used in place of Figure 4C-5 to satisfy Criterion A in the previously described Standard...

(Proposed Warrant)

Figure 4C-7. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



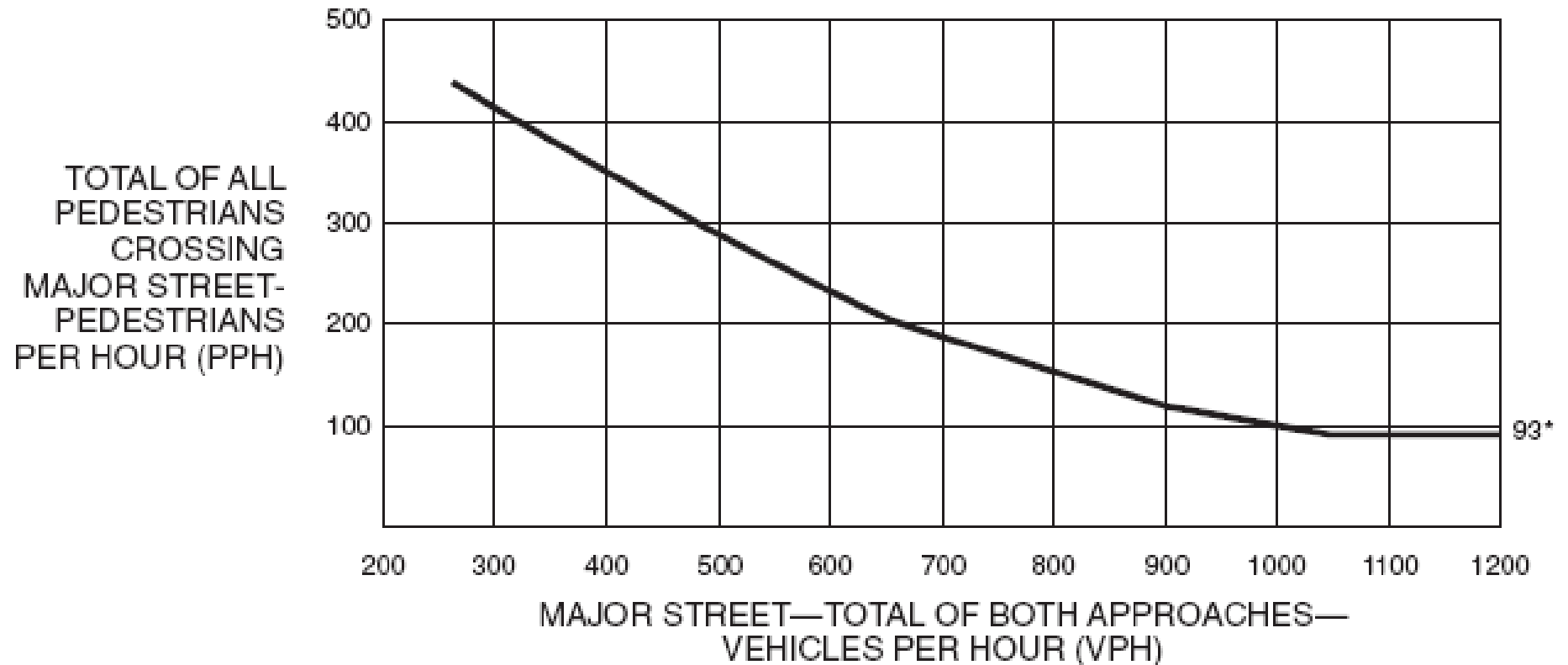
*Note: 75 pph applies as the lower threshold volume.

Then:

... and Figure 4C-8 may be used in place of Figure 4C-6 to satisfy Criterion B.

(Proposed Warrant)

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

Standard:

The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal (or stop sign) controlling the street that pedestrians desire to cross is less than 90 m (300 ft), unless...



(Proposed Warrant)

... the proposed traffic control signal will not restrict the progressive movement of traffic.



(Proposed Warrant)

If this warrant is met,
and a traffic control signal is justified by
an engineering study...

the traffic control signal shall be
equipped with pedestrian signal heads
conforming to set requirements.

Also, the following Criterion apply:

Option:

The criterion for the pedestrian volume crossing the major **street** may be reduced as much as 50 percent if the **15th-percentile** crossing speed of pedestrians is less than 1.1 m/sec (3.5 ft/sec).

A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street. (Note: Rate of gap notation was removed.)



II. Rectangular Rapid Flashing Beacon (RRFB)

Interim Approval for the Optimal use of the Rectangular Rapid Flashing Beacons (RRFB)

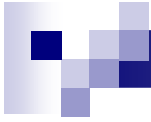
FHWA Memorandum Dated July 16, 2008



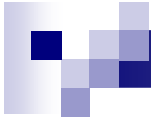
Purpose:

The purpose of the memorandum is to issue an Interim Approval for the optimal use of Rectangular Rapid Flashing Beacons (RRFB) as warning beacons under certain limited conditions.





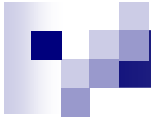
The RRFB does not meet the current standards for flashing warning beacons as contained in the 2003 edition of the MUTCD, Chapter 4K...



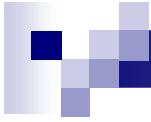
...which requires a warning beacon to be round in shape and either 8 or 12 inches in diameter,

...to flash at a rate of approximately once per second,

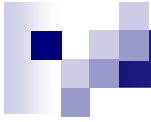
...and to be located no less than 12 inches outside the nearest edge of the warning sign it supplements.




The RRFB uses rectangular-shaped high-intensity LED-based indications, flashes rapidly in a wig-wag “flickering” flash pattern, and is mounted immediately between the crossing sign and the sign’s supplemental arrow plaque.



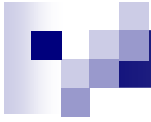
The data show very high rates of motorist “yield to pedestrians” compliance, mostly in the high 80’s to close to 100 percent, in comparison to far lower rates (in 15-20 percent range) for standard beacons.



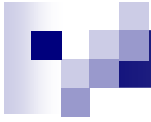
The very high yielding rates are sustained even after 2 years in operation, and no identifiable negative effects have been found.




The Office of Transportation Operations has reviewed the available data and considers the RRFB to be highly successful for the applications tested (uncontrolled crosswalks).




The RRFB offers significant potential safety and cost benefits, because it achieves very high rates of compliance at a very low relative cost in comparison to other more restrictive devices that provide comparable results, such as full midblock signalization.



An RRFB shall only be installed to function as a Warning Beacon (see 2003 MUTCD Section 4K.03).



An RRFB shall only be used to supplement a W11-2 (Pedestrian) or S1-1 (School) crossing warning sign with a diagonal downward arrow (W16-7p) plaque, located at or immediately adjacent to a marked crosswalk.



An RRFB shall not be used for crosswalks across approaches controlled by YIELD signs, STOP signs, or traffic control signals.




Beacon Flashing Requirements:

When activated, the two yellow indications in each RRFB shall flash in a rapidly alternating “wig-wag” flashing sequence (left light on, then right light on).



Beacon Operations:

The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after the pedestrian clears the sidewalk.

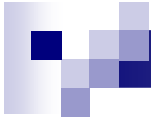


The duration of a predetermined period of operation of the RRFBs following each actuation should be based on the MUTCD procedures for timing of pedestrian clearance times for pedestrian signals.



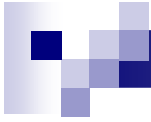
III. Pedestrian Signal Considerations

- Sidewalks
- Percentage of pedestrian volume warrants versus a flat volume
- Timing Constraints
- Audible Signals (General Discussion)



IV. Bicycles as Pedestrians

- Detection (How, What, Where, etc...)
- Legal Issues



V. ADA Requirements for Pedestrian Signals

- Wheelchair Ramps (location issues)
- Push buttons (location issues)